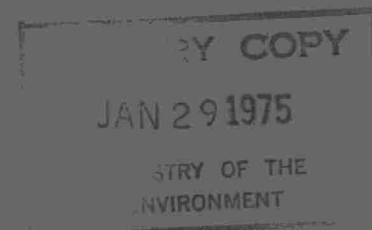


OPERATING SUMMARY

SAULT STE. MARIE

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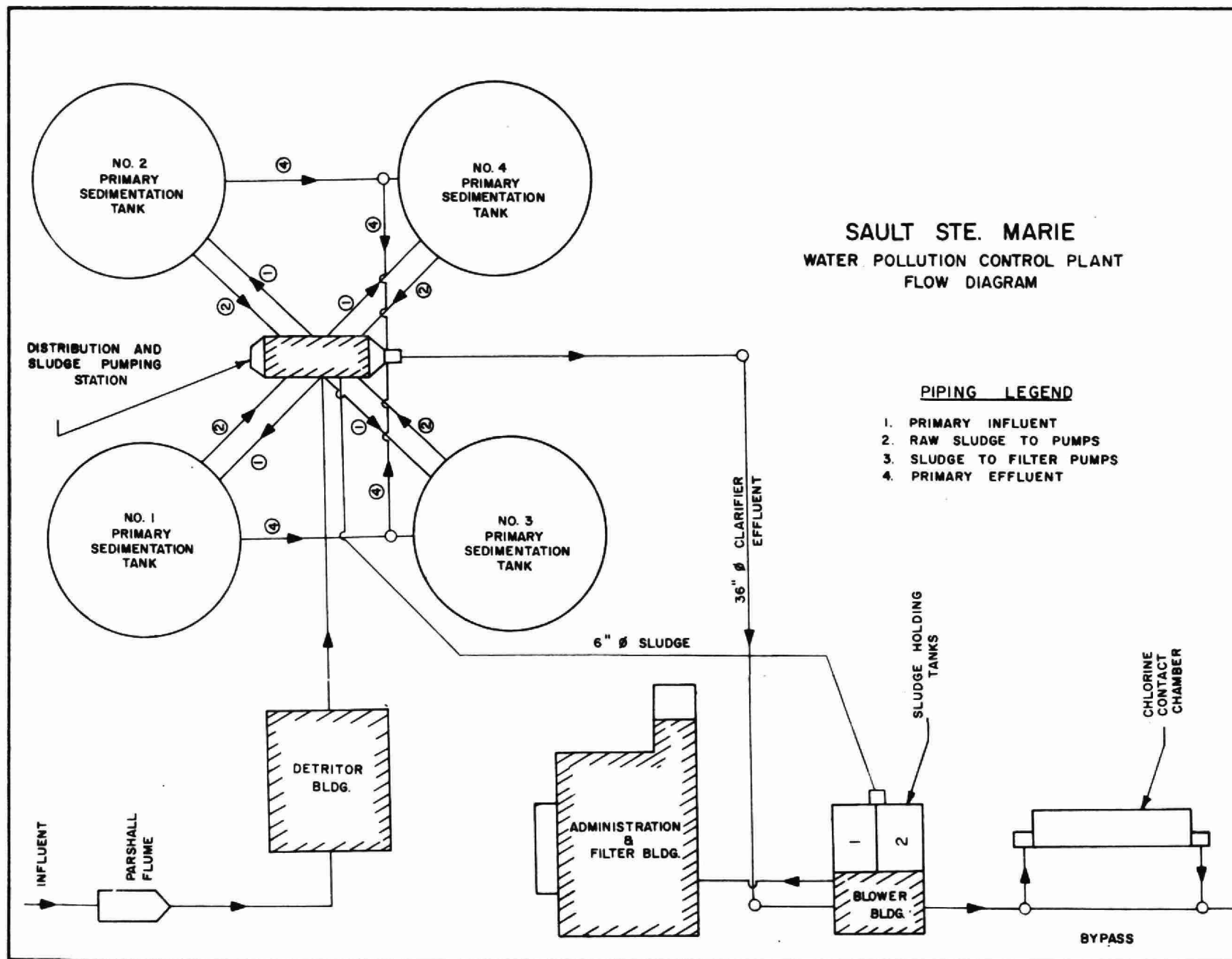
SAULT STE. MARIE  
WATER POLLUTION CONTROL PLANT

operated for  
THE CITY OF SAULT STE. MARIE  
by the  
MINISTRY OF THE ENVIRONMENT

1973 ANNUAL OPERATING SUMMARY

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## DESIGN DATA

PROJECT NO.	2-0020-58	<u>PRIMARY TREATMENT</u>	<u>SLUDGE HANDLING</u>
TREATMENT	Primary	<u>Comminution</u>	<u>Holding Tank - Aerated</u>
DESIGN FLOW	8.0 mgd	Type: Barminutor Size: Two Model C (36")	Size: Two 24' x 15' x 11½' (8,280 cu ft or 51,600 gal)
DESIGN POPULATION	72,500	<u>Grit Removal</u>	Air Supply: One Sutorbilt
BOD - Raw Sewage - Removal	250 mg/l 35%	Type: Dorr detritor Size: Two 18' x 18' x 1'3" (6,240 gal)	<u>Vacuum Filter</u>
SS - Raw Sewage - Removal	200 mg/l 60%	Retention: 1.13 min Flow Velocity: 0.209 fps	Type: Komline-Sanderson Size: Two 200 sq ft
		<u>Primary Sedimentation</u>	<u>PUMPING STATIONS</u>
		Type: Dorr Size: Four 70' dia x 8' swd (900,000 gal)	<u>Pim Street Pumping Station</u>
		Retention: 2.3 hr Loading: Surface, 520 gal/ft²/day Weir, 13,000 gal/ft/day	Type: Worthington Size: One 10,000 gpm @ 50' tdh (diesel) Two 6,300 gpm @ 40' tdh (electric)
		<u>CHLORINATION</u>	<u>Clark Creek Pumping Station</u>
		Type: W & T Size: One 800 lb/day	Type: Worthington Size: One 12320 gpm (electric) One 13000 gpm (diesel) Two 7000 gpm (electric) One diesel generator
		<u>Chlorine Contact Chamber</u>	<u>Wiita Pumping Station (Temporary)</u>
		Size: One 60' x 20' x 12' Reten (90,000 gal) Retention: 16.2 min	Type: Smart-Turner Size: 2400 gpm @ 30' tdh (electrical)
		<u>OUTFALL</u>	
		- to St. Mary's River	

# '73 Review

## GENERAL

Expansion of the treatment plant to 12.0 million gallons per day commenced in January, 1973. It involves the addition of two clarifiers, a new chlorine contact chamber, an outfall line, and screening and pumping equipment. It is anticipated that the construction will be completed late in 1974.

Numerous operating problems were experienced as a result of the expansion, but were resolved between the Ministry of the Environment and the contractor.

## PLANT FLOWS AND CHLORINATION

A total of 3945 million gallons of raw sewage was treated at the plant, representing an average daily flow of 10.9 million gallons. The average daily flow exceeded the design flow of 8.0 million gallons per day 90 per cent of the time.

A total of 182 thousand pounds of chlorine was used during the year, representing an average dosage of 4.6 mg/l.

## PLANT EFFICIENCY

The raw sewage BOD and suspended solids concentrations of 120 mg/l and 150 mg/l compare with the 1972 figures of 115 mg/l for BOD, and 138 mg/l for suspended solids. The average removal efficiencies for BOD and suspended solids were respectively 34 per cent and 59 per cent and were slightly below the design removal criteria.

### VACUUM FILTRATION

A total of 8.03 million gallons of raw sludge was pumped to the vacuum filters with an average total solids content of 5.8 per cent.

### CONCLUSIONS

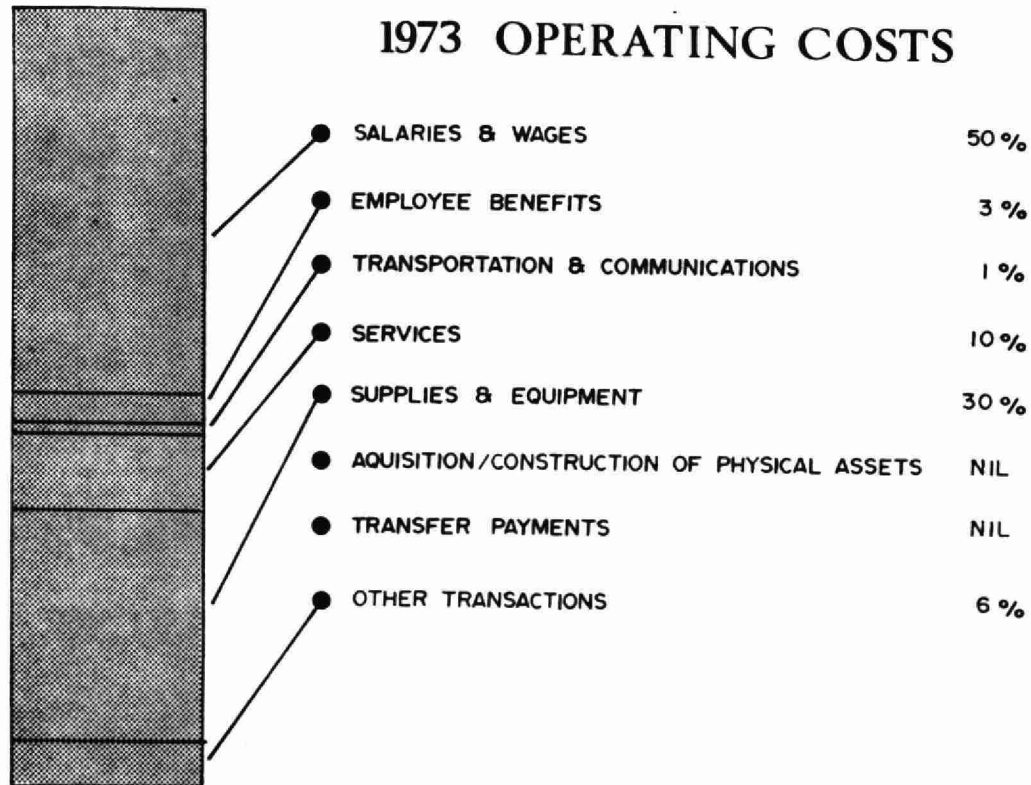
The plant produced a good quality effluent in spite of the fact that operating problems developed because of construction.

The efficiency of the process treatment will increase considerably after the completion of the plant expansion in late 1974.



# ANNUAL COSTS

## 1973 OPERATING COSTS



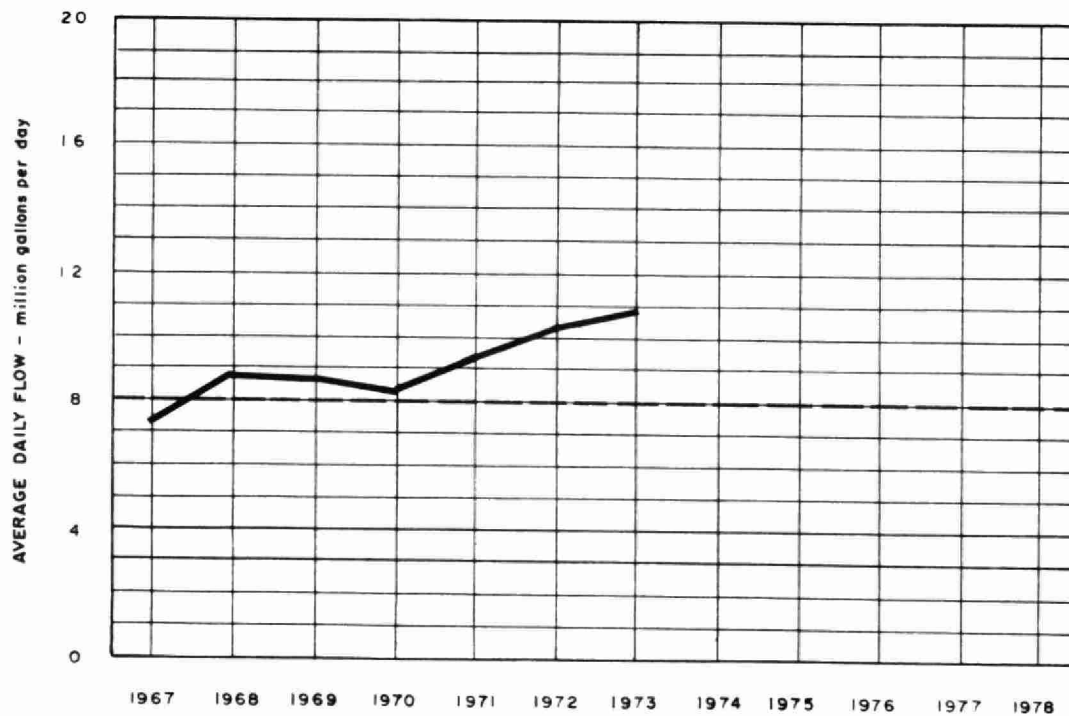
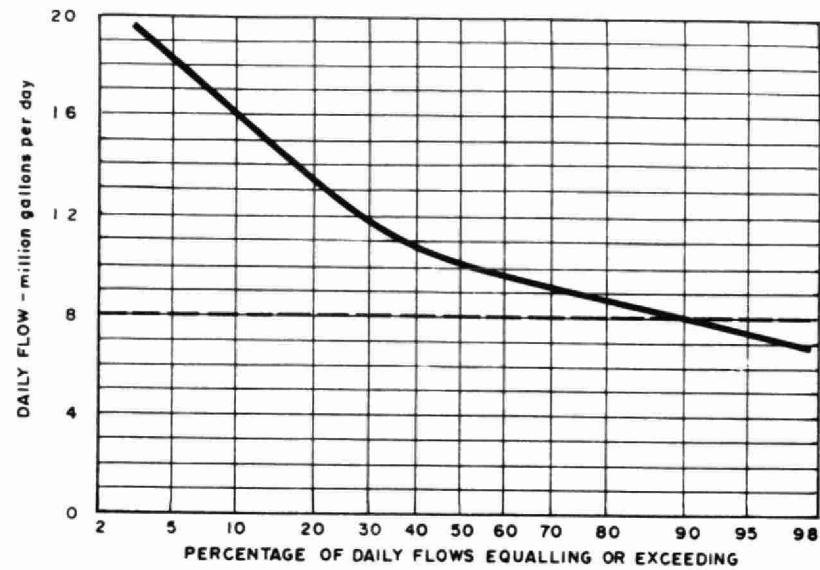
## YEARLY OPERATING COSTS

YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			\$/M.G.	¢/lb BOD
1968	3196	\$ 136,641	43	14
1969	3163	146,194	46	11
1970	3107	162,678	52	17
1971	3424	169,747	50	16
1972	3748	189,643	51	14
1973	3945	190,493	48	10

## OPERATING EXPENDITURES

SALARIES AND WAGES	<u>\$95,030</u>
EMPLOYEE BENEFITS	<u>5,709</u>
TRANSPORTATION & COMMUNICATIONS	<u>2,324</u>
SERVICES	<u>18,822</u>
SUPPLIES AND EQUIPMENT	<u>57,967</u>
ACQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	<u>0</u>
TRANSFER PAYMENTS	<u>0</u>
OTHER TRANSACTIONS	<u>10,668</u>
TOTAL	<u>\$190,493</u>

# PROCESS DATA FLOWS

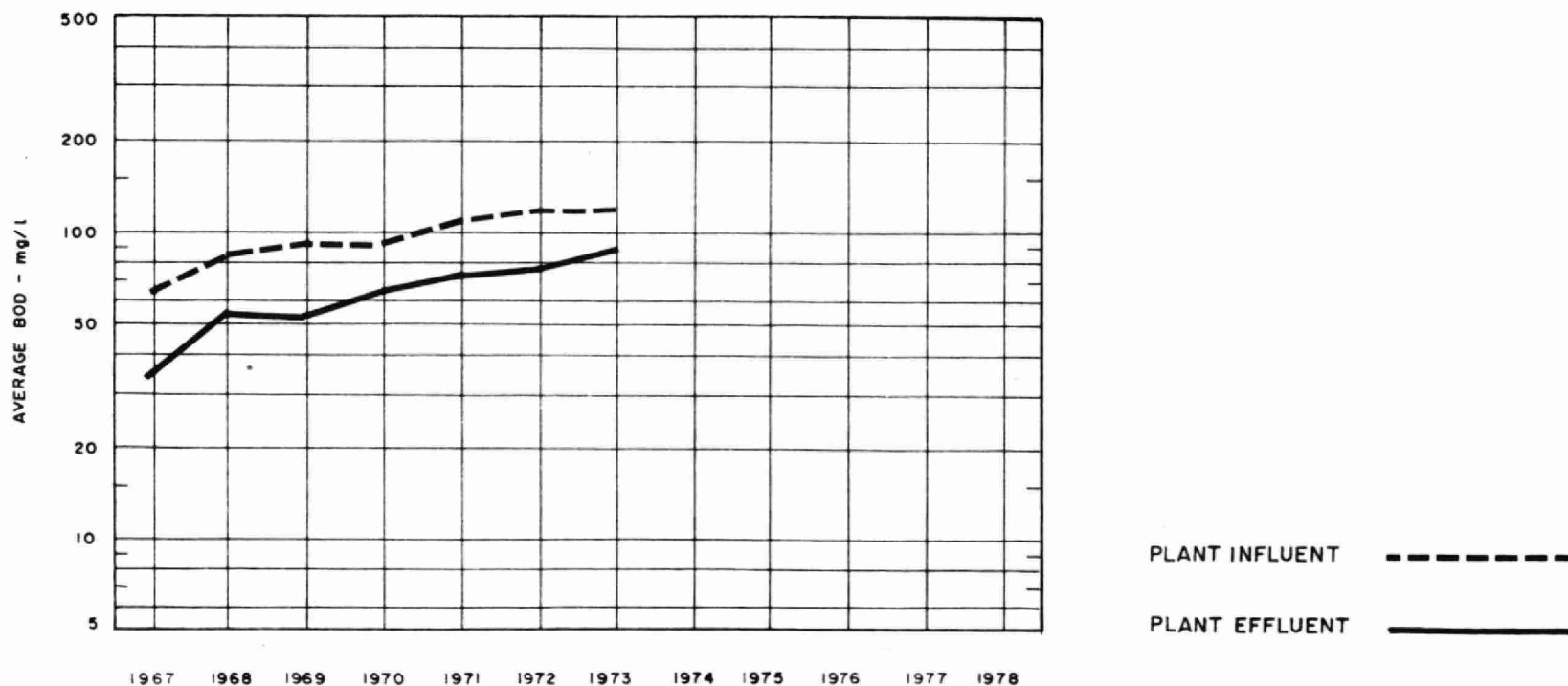
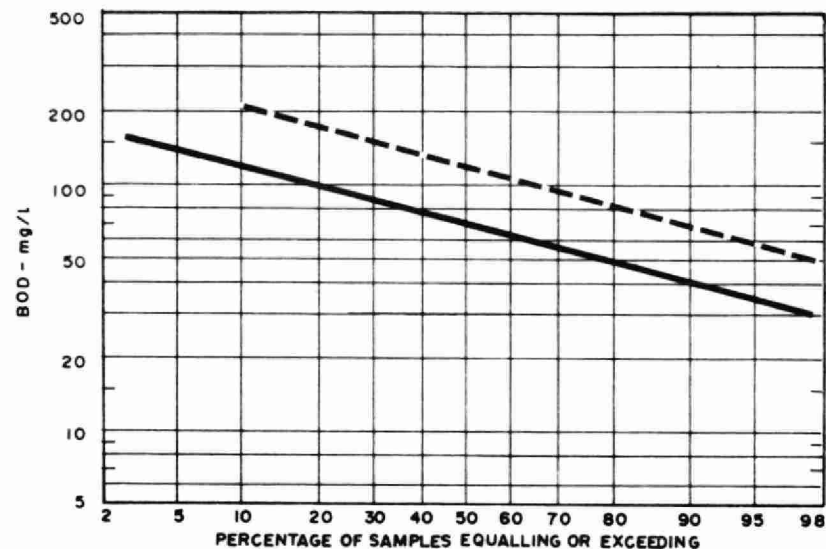


DESIGN CAPACITY ———

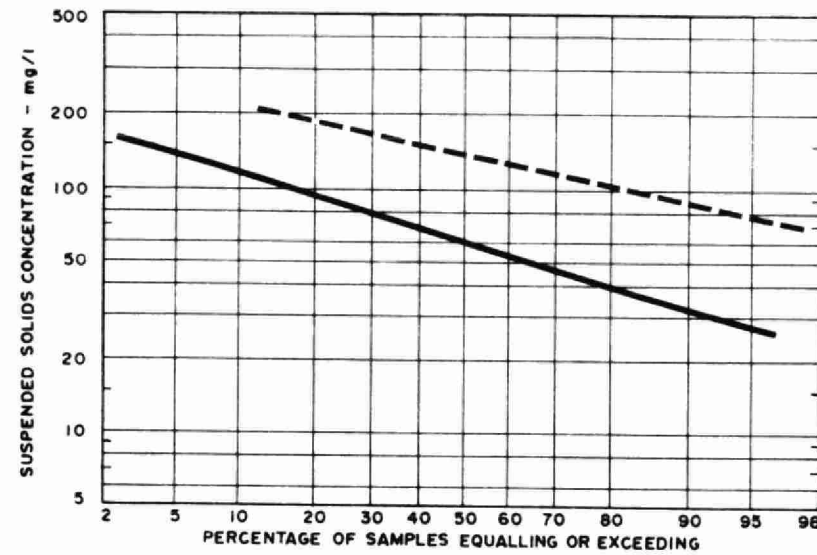
## PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW million gallons	AVERAGE DAY mil. gal	MAXIMUM DAY mgd	INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l	EFFLUENT mg/l	REDUCTION		INFLUENT mg/l P	EFFLUENT mg/l P
						%	10 <sup>3</sup> pounds			%	10 <sup>3</sup> pounds		
JAN	282	9.11	19.4	120	87	28	96	150	52	64	260	5.8	4.0
FEB	211	7.52	10.8	130	97	24	65	160	54	66	220	5.3	5.3
MAR	392	12.60	22.5	100	62	38	140	120	51	56	250	8.6	6.4
APR	274	9.12	15.2	92	82	11	27	150	61	60	250	6.1	5.5
MAY	301	9.71	14.6	110	86	22	72	140	62	55	230	4.6	4.1
JUNE	274	9.12	14.1	94	68	28	71	150	57	61	250	5.7	3.7
JULY	301	9.71	16.2	84	63	25	63	160	70	56	260	3.5	3.1
AUG	450	14.50	17.8	120	66	46	250	140	64	53	320		
SEPT	393	13.10	18.5	110	61	45	190	160	65	60	380	4.8	3.3
OCT	344	11.10	18.0	150	74	49	280	180	74	59	360	6.1	3.5
NOV	392	13.10	19.5	180	107	41	290	160	65	59	350	4.0	2.7
DEC	331	10.70	16.3	200	123	38	250	140	55	60	270	5.3	3.5
TOTAL	3945	-	-	-	-	-	1790	-	-	-	3400	-	-
AVG.		10.90	MAXIMUM 22.5	120	82	34	150	150	61	59	280	5.3	3.9
No. of Samples	-	-	-	64	64	-	-	197	197	-	-	14	14

# BIOCHEMICAL OXYGEN DEMAND

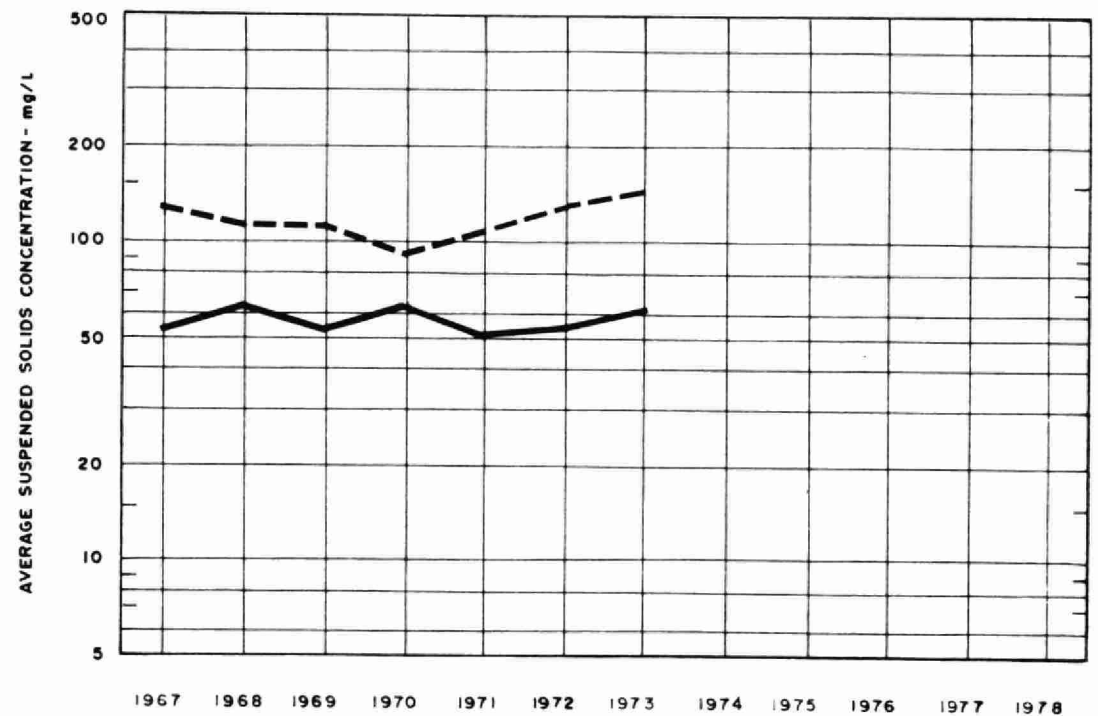


# SUSPENDED SOLIDS

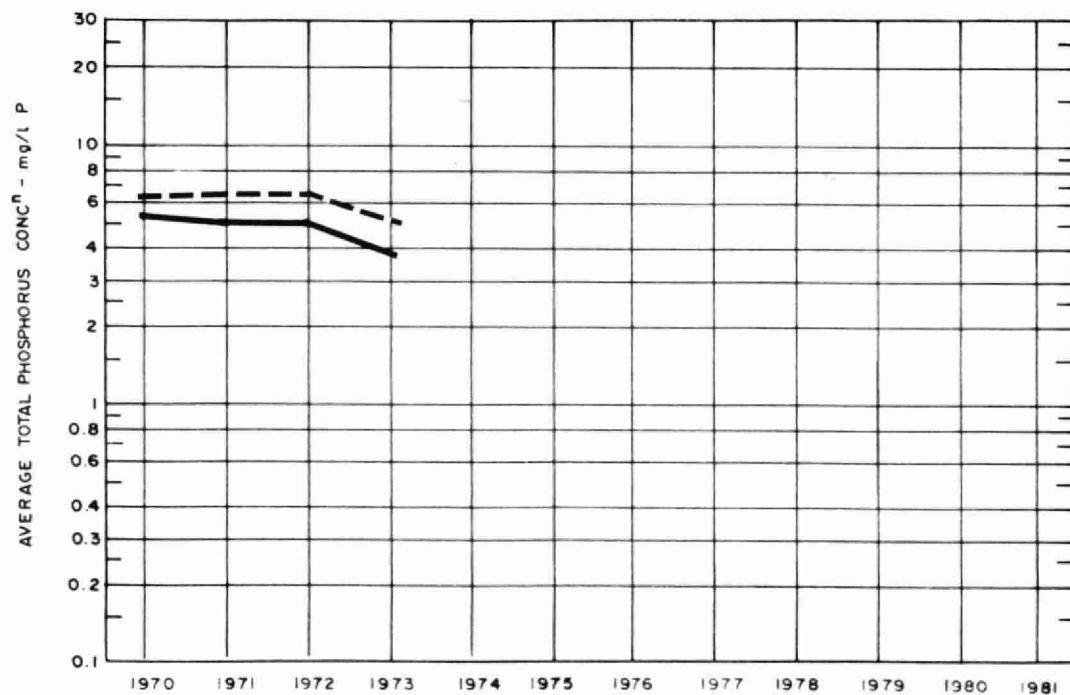
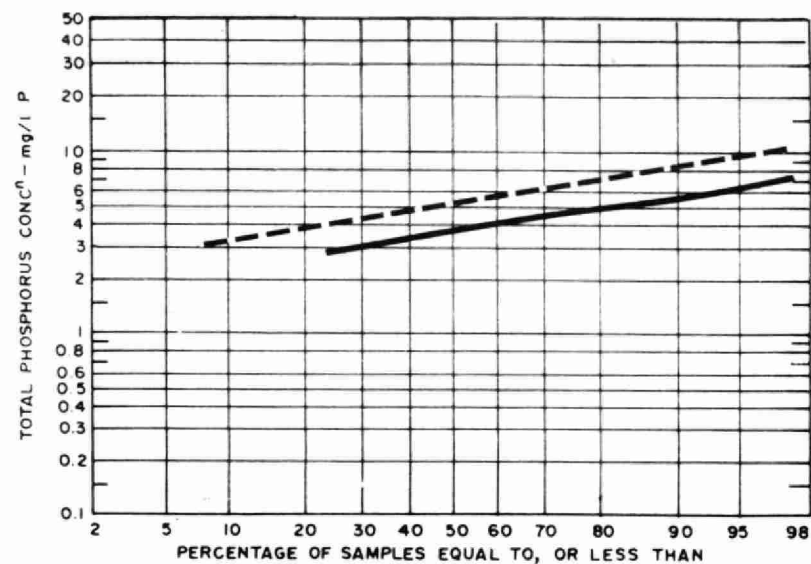


PLANT INFLUENT      - - - - -

PLANT EFFLUENT      \_\_\_\_\_



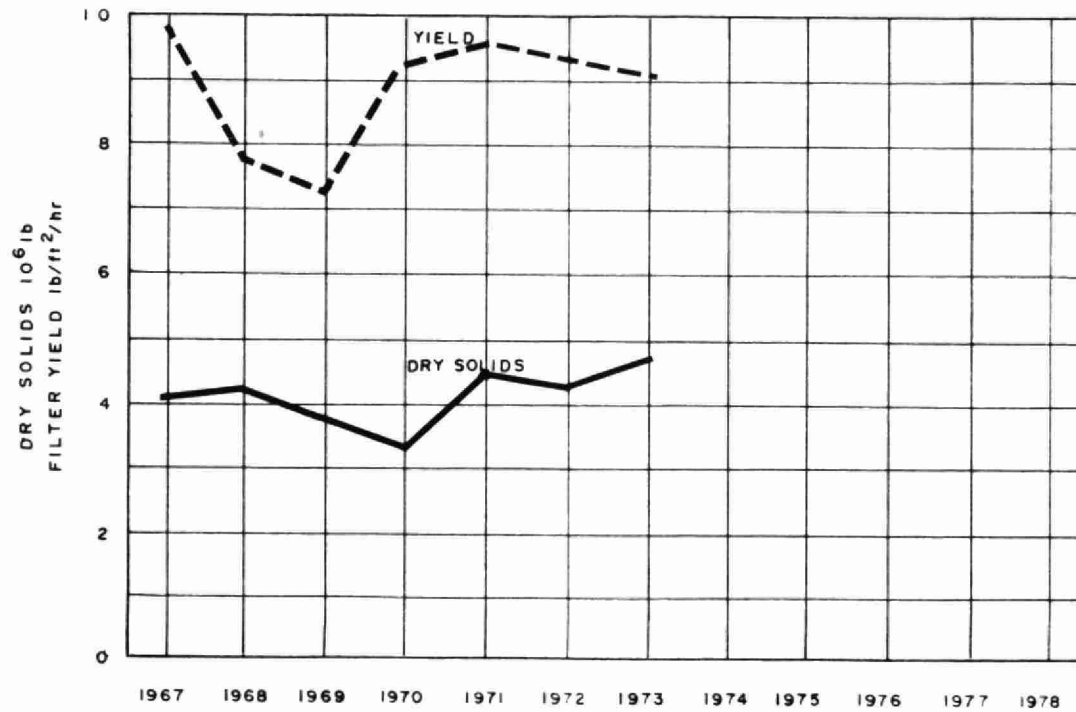
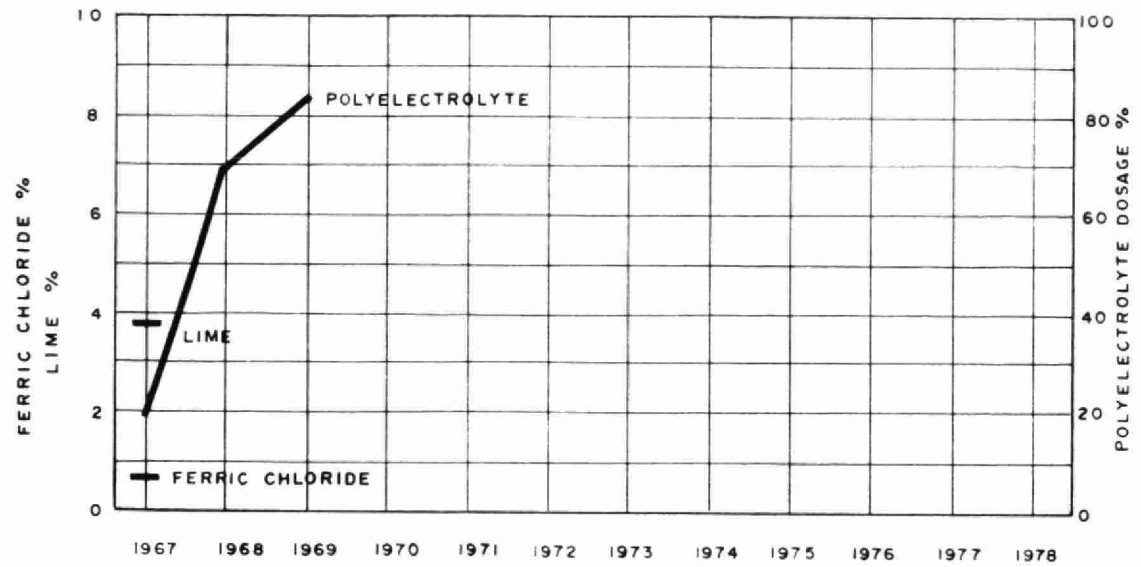
# PHOSPHORUS



PLANT INFLUENT -----

PLANT EFFLUENT \_\_\_\_\_

# VACUUM FILTRATION





## TREATMENT DATA

MONTH	GRIT	CHLORINATION		VACUUM FILTER OPERATION						
	QUANTITY REMOVED cubic feet	CL <sub>2</sub> USED 10 <sup>3</sup> pounds	AVG. DOSE mg/l	TOTAL FILTER HOURS	SLUDGE TO FILTERS			YIELD (AVG) lb/ft <sup>2</sup> /hr.	FILTER CAKE T-S percent	SLUDGE HAULED cubic yards
					QUANTITY 10 <sup>5</sup> gallons	TOTAL SOLIDS percent	DRY SOLIDS 10 <sup>3</sup> pounds			
JAN	150	14.8	5.2	215	7.3	5.2	3.2	8.8	22.0	850
FEB	75	13.5	6.4	186	6.5	5.1	3.4	8.9	20.1	725
MAR	223	15.4	3.9	203	6.7	5.2	3.6	8.7	22.8	735
APR	160	14.5	5.3	209	6.8	5.8	4.0	9.3	21.6	751
MAY	230	13.6	4.5	209	6.8	5.6	3.9	9.0	23.0	805
JUNE	170	15.7	5.7	193	6.4	6.0	3.9	9.6	23.9	765
JULY	190	14.4	4.8	227	6.8	6.2	4.2	9.4	25.5	791
AUG	170	15.8	2.4	208	6.3	5.8	3.7	8.5	24.1	688
SEPT	100	15.3	3.9	182	5.4	6.2	3.5	9.6	24.4	615
OCT	215	16.8	4.9	241	7.1	7.4	5.2	10.3	27.9	790
NOV	295	16.1	4.1	236	7.4	6.0	4.3	8.7	24.5	710
DEC	130	16.1	4.8	213	6.8	5.4	3.7	8.4	22.3	630
TOTAL	2108	182.0		2522	80.3		46.6			8855
AVG.	0.5 per m g.	15.2	4.6	210	6.7	5.8	3.9	9.1	23.5	738

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